Attracting, developing & retaining top technical people

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• MEDIAN AGE OF INTERNATIONAL PROFESSIONAL SOC. MEMBERSHIP: 52yrs
• MANY TRAINING PROGRAMS IN MAJOR COMPANIES DOWNSIZED OR ARE GONE
• MOST RESEARCH CENTRES IN THOSE MAJOR OIL COMPANIES ARE GONE
• A LARGE NUMBER OF THE MAJOR COMPANIES ARE GONE (MERGED)
• IN 10 YEARS, MANY OF THE PEOPLE IN THE BUSINESS WILL HAVE RETIRED

WHO WILL REPLACE THEM?
Projected World Energy Supplies

World Energy Demand

1900 1920 1940 1960 1980 2000 2020 2040 2060 2080 2100

100 BILLION BARRELS

Natural Gas
Coal
Crude Oil
Hydroelectric
Nuclear Electric
Solar Wnd
Geothermal
Tar Sands/Oil Shales

Careers in Oil & Gas Will be Important
New Technologies
Decreasing Fossil Fuels

after Edwards, AAPG 8/97

Global Exploration Accessibility

Using today’s New Technologies/Politics

Circa 1990

54% Inaccessible
46% Accessible

Circa 1996

16% Inaccessible
Accessorible

Eastern Bloc
Former USSR
C.I.S.
Venezuela
China

The recent opening to exploration of previously inaccessible areas has created a window of opportunity which has never been equaled before and likely will never be seen again. In 2005 there are no politically/technically “inaccessible” areas except Arctic & Antarctic preservation areas.
Global Exploration
Opportunities for Future Growth (after AAPG)

Technology Impact
Deepwater Plays across the Globe

What's In The Pipeline?
START UNI

8-10 year prep time for an industry professional from uni entrance!

PRODUCTIVE GEOSCIENTIST or ENGINEER

BSc

3-4 years

MSc

1 year

Hons.

1 year

Other industries hire

3-4 years

UNIVERSITY

4

EMPLOYMENT TRENDS OF RECENT GEOSCIENCE MASTER’S RECIPIENTS

OIL & GAS INDUSTRY gets 15% of geoscience MSc's, or about 600 entries/year into industry with 100,000 professional geoscientists

From: AGI study of Geoscience Graduates from Western Universities
Why not join the oil industry?

- UNSTABLE CAREER FUTURE
- LOW TECH CAREER
- DON’T LIKE BEING OUTDOORS
- BETTER PAY IN OTHER FIELDS
- ENVIRONMENTAL CONCERNS

In the context of those technical areas where we have some control, what can the Uni’s & Industry do …

- … to attract strong students to O&G Masters’ programs
- … to make entry level graduates immediately effective when they join industry
- … to develop & retain people through their careers
1. ATTRACTING STUDENTS TO O&G PROGRAMS:
WHAT CAN UNIVERSITY DEPARTMENTS DO?

- RELEVANT "CAREER USEFUL" COURSE CONTENT INTO CURRICULUM (Heath 2000)

- CROSS-DISCIPLINE COURSES: G & G, PET ENG, COMPUTER DB's & various APP's, RISK ANALYSIS

- INCREASE COOPERATION w. OTHER UNI's, PROFESSIONAL SOCIETIES (STUDENT CHAPTERS)

- ESTABLISH RELATIONSHIPS / LINKAGES WITH INDUSTRY; SHOWCASE INDUSTRY TO STUDENTS

- PROMOTE RESEARCH & MASTERS PROGRAMS w. STRONG INDUSTRY BIAS; WORKSTATIONS TO MANAGE/INTEGRATE
COMMON PARADIGM AT MANY UNIVERSITIES: ISOLATED, NON-APPLIED RESEARCH & TRAINING

PRESENT REALITY: RELEVANT, COLLABORATIVE RESEARCH NEEDED
<table>
<thead>
<tr>
<th>MD (Entry Point to TD)</th>
<th>Net Reservoir Sand</th>
<th>Net/Gross</th>
</tr>
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<tbody>
<tr>
<td>3055’</td>
<td>1023’</td>
<td>.33</td>
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**Geo-steering**

North Sea - Joanne Field - Andrew Reservoir

Value added $12MM
Based on saved costs

Modified from Holien and Holmes, 1994
**Hi-Resolution Image & Log Analysis**

Lloyd, 2000

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**Impact of Introducing New Technologies**

Successes in Tertiary Age Deltaic Reservoirs, USA Gulf Coast

- **Production History**
- **Projected Decline**
- **Technology Impact**

Technology added significant new reserves

Clayton, 1998
Synergistic Technologies: Integrated Workstation Applications & Visualisation Capabilities

Australian School of Petroleum / Schlumberger Joint Training and Research Centre (Univ Adelaide)

Integrated 3D Model
WHAT CAN INDUSTRY DO?

- **ENGAGE**
  - Teaching / Training Alliances
  - Provide Internships / Sabbaticals
  - Outsource Research

- **INVOLVE**
  - Visits / Mentoring / Career Days / Seminars
  - Board / Committee Representation
  - Increase Company : University Dialog

- **INVEST**
  - Scholarships / Prizes / Data / Equipment
  - Promote Professional Society Membership
  - Endow Chairs / Lectureships
  - Lobby Govt. (eg via IPA, APPEA)

2. Better preparing Graduates for immediate impact on entering the industry, by re-designing content of Masters Programs
Pre-requisites

• Strong first degree (Bachelors with Honors) in Mechanical, Chemical or Civil Engineering or equivalent, or a Geoscience

• Minor (or equivalent) in Natural Sciences (predisposition to cross-discipline thinking)

• Good communication skills in English

Standard Academic Content

<table>
<thead>
<tr>
<th>PETROLEUM ENGINEERING</th>
<th>GEOSCIENCES</th>
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<tbody>
<tr>
<td>• Petroleum Geoscience</td>
<td>• Sedimentology &amp; Sequ. Strat</td>
</tr>
<tr>
<td>• Formation Evaluation (FE)</td>
<td>• Seisms &amp; Subsurf. Mapping</td>
</tr>
<tr>
<td>• Reservoir Eng. &amp; Mgt.</td>
<td>• Petroleum Systems</td>
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<td>• Drilling Technology</td>
<td>• Reservoir Engineering &amp; FE</td>
</tr>
<tr>
<td>• Production Technology</td>
<td>• Resource/Risk Evaluation</td>
</tr>
<tr>
<td>• Field Development Project</td>
<td>• Field Mapping/Develop. Project</td>
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<td>• Research-Oriented Project</td>
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Pre-requisites
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Standard Academic Content
• Petroleum Geoscience
• Formation Evaluation
• Reservoir Engineering
• Drilling Technology
• Production Technology
• Field Development Project
• Research-Oriented Project

Additional Skills
• Technical writing and presentation
• IT skills and a computer language
• Ethics, QHSE, Legal & Business
• Teamwork and leadership skills
• Internship or practical project
• Integration competencies
• Professional awareness (member of student chapter)

3. Training & Development thru' the Professional's career
Retaining staff

Retention in tough times

Saratoga survey of 8000 people in 35 industries: leading drivers for retention

- exciting work & challenge
- career growth, learning & development
- fair pay & benefits
- relationships & working with great people
- supportive management, a great boss
- pride in the organization, it’s mission & product
- great work environment or culture
- being recognized, valued & respected
- meaningful work, making a difference
- autonomy
Saratoga Research indicates...

• Pay usually appears as the 3rd or 4th item in what motivates and retains people BUT jumps to 1 or 2 if any of the following are not in place:
  • ... Belief and trust company leadership
  • ... Belief in career growth
  • ... Trust & respect in the manager

CONCLUSIONS

• ADEQUATE SUPPLY OF WELL TRAINED PROFESSIONALS ESSENTIAL FOR A ROBUST PETROLEUM INDUSTRY
  • ATTRACT TOP STUDENTS INTO MASTERS PROGRAMS
  • MASTERS PROGRAMS & RESEARCH MEET INDUSTRY NEEDS

• ALL STAKE HOLDERS MUST APPRECIATE THAT AN EDUCATIONAL / INDUSTRIAL CONTINUUM EXISTS. THE UNIVERSITY IS THE UPSTREAM PART OF E&P BUSINESS

• COMPANIES MUST MAKE THE SAME CAREFULLY THOUGHT OUT STRATEGIC BUSINESS DECISIONS REGARDING THEIR FUTURE HUMAN RESERVES AS FOR THEIR SUBSURFACE RESERVES

• UNIVERSITIES & INDUSTRY MUST ALLIANCE THEMSELVES TO ASSURE SKILLS DEVELOPMENT OF STAFF THROUGHOUT THEIR CAREERS. KEY TO TECHNICAL ADVANCEMENT & RETENTION.
The Future....